What is claimed is:

1. A method of estimating timing of at least one of the beginning and the end of a transmitted signal segment in the presence of time delay in the signal transmission channel in an OFDM system, the method comprising:

providing a set of pseudo-random signal m-sequences PN(t;k) (k = 1, ... , K; K ≥ 1) for which a convolution signal formed from any two sequences satisfies PN(t;i)*PN(t + Δt;j) = δ(Δt)·δ(i,j), where δ(Δτ) is a delta function and δ(i,j) = 0 unless i = j;

appending a selected sequence PN(t;k) to at least one signal frame to be transmitted to form a padded signal frame;

transmitting at least one padded signal frame through a transmission channel in which the transmitted signal may be received with an uncontrollable time delay Δt(delay);

receiving a received version Rc(t) of the transmitted signal and forming a convolution signal,

$$Rc(t;\Delta t;comp) = \sum_{k=k1}^{k2} PN(t + \Delta t;k)*Rc(t),$$

where Δt is a selected time increment and k1 and k2 satisfy $1 \le k1 \le k2 \le K$;

forming a remainder signal Rc(t;rem) = Rc(t) - Rc(t;Δt;comp); and

determining at least one time at which at least one of the sequences PN(t;k) (k = k1, k1+1, ... , k2) begins in the received signal Rc(t).

2. The method of claim 1, further comprising determining a carrier frequency associated with said at least one of said sequences PN(t;k).

3. The method of claim 1, further comprising using at least one of said PN sequences to estimate at least one parameter associated with said transmission channel.

4. The method of claim 1, further comprising replacing at least one guard interval associated with at least one of said signal frames with one of said PN sequences.

5. The method of claim 1, further comprising using at least one PN sequence, associated with one of said padded signal frames, to provide time synchronization for said associated padded signal frame.

6. A system estimating timing of at least one of the beginning and the end of a received signal in the presence of time delay in the signal transmission channel in an OFDM system, the system comprising a computer that is programmed:

to provide a set of pseudo-random signal m-sequences PN(t;k) (k = 1, ... , K; K ≥ 1) for which a convolution signal formed from any two sequences satisfies $PN(t;i)*PN(t + \Delta t;j) = \delta(\Delta t)\cdot\delta(i,j)$, where $\delta(\Delta\tau)$ is a delta function and $\delta(i,j) = 0$ unless i = j;

to receive at least one padded signal frame Rc(t) transmitted through a transmission channel in which the transmitted signal may be received with an

uncontrollable time delay $\Delta t(delay)$, where a padded signal frame comprises a signal frame appended to a selected sequence PN(t;k)

to form a convolution signal,

$$Rc(t;\Delta t;comp) = \sum_{k=k1}^{k2} PN(t+\Delta t;k)*Rc(t),$$

where Δt is a selected time increment and k1 and k2 satisfy $1 \leq k1 \leq k2 \leq K$;

to form a remainder signal Rc(t;rem) = Rc(t) - Rc(t;Δt;comp); and

to determine at least one time at which at least one of the sequences PN(t;k) (k = k1, k1+1, ... , k2) begins in the received signal Rc(t).

7. The system of claim 6, wherein said computer is further programmed to determine a carrier frequency associated with said at least one of said sequences PN(t;k).

8. The system of claim 6, wherein said computer is further programmed to use at least one of said PN sequences to estimate at least one parameter associated with said transmission channel.

9. The system of claim 6, wherein said computer is further programmed to replace at least one guard interval associated with at least one of said signal frames with one of said PN sequences.

10. The system of claim 6, wherein said computer is further programmed to use at least one PN sequence, associated with one of said padded signal frames, to provide time synchronization for said associated padded signal frame.